

**U.S. Marine Corps**



# **ECONOMIC ANALYSIS**



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Chapter 1

GENERAL

1.1. INTRODUCTION. The objective of this standard is to identify the reporting requirements for a feasibility study/economic analysis. This analysis provides the means to identify and evaluate the various proposed alternatives, to document and compare the costs impacts of each proposed alternative, and to identify the preferred alternatives. It is a prime source of information to be used in making the final selection of an alternative for further development.

1.2. SCOPE. The requirements defined for economic analysis by higher head-quarters are covered by this standard. Additionally, portions of two other documentation requirements, the Funding Support Analysis and the Development Alternatives Analysis have been included.

1.2.1. Funding Support Analysis. The Funding Support Analysis documentation required by this standard is an added requirement in the economic analysis process. The requirements for reporting a funding profile for the selected alternative are defined as an auxiliary responsibility of economic analysis. However, the final decision process for funding approval is reserved as a project management function outside the scope of economic analysis.

1.2.2. Development Alternatives Analysis. The Development Alternatives Analysis documentation required by this standard is also an added requirement in the economic analysis process. The requirements for reporting several alternative means for acquiring specific parts of any proposed system are defined as an auxiliary responsibility of economic analysis. This will identify the cost differential and any added risk between various acquisition strategies such as the purchasing versus the leasing of equipment.

1.3. APPROACH. The approach to economic analysis is to develop a structure of cost categories to estimate unit costs, project these costs throughout the full life cycle of the system, establish funding schedules, and propose specific means of cost-effective implementation and operation.

1.3.1. Definition of Economic Analysis. The economic analysis is performed as part of the concept development in defining the project. Through the system development effort the economic analysis must be updated to reflect the most current costs. Economic analysis is a systematic approach to evaluating the relative worth of proposed projects. The technique is based on the premise that there are alternative ways of reaching an objective and each alternative requires certain resources and produces certain results. The economic analysis examines and relates the costs, benefits, and uncertainties of each alternative in order to determine the most cost-effective means of meeting the objective.

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1.3.2. Principles of Economic Analysis. Three basic principles must be incorporated in the economic analysis:

a. The analysis must investigate all feasible alternative methods of satisfying a given objective. To be feasible an alternative must be both technologically and operationally feasible.

b. The analysis must consider both current and future expenditure patterns of all proposals.

c. Since there is a "time value of money", the analysis must consider not only how much a proposal will cost but also when the expenditures will be made. This consideration is included in the analysis by expressing each alternative's life-cycle costs in terms of its "present value".

1.3.3. Elements of an Economic Analysis. The Economic Analysis Process is a systematic procedure for comparing alternative means of meeting a specific objective. The process consists of six key elements. They are:

a. Establishing and defining the goal or objective.

b. Formulating appropriate assumptions.

c. Searching out alternatives for accomplishing the objective.

d. Determining the costs (inputs) and the benefits (outputs) of each alternative.

e. Comparing costs and benefits of the alternatives.

f. Testing the sensitivity of the analysis outcome to major uncertainties.

1.3.4. Budget Concerns. An economic analysis will seldom lead to cost estimates which are consistent with the budget. This inconsistency occurs for several reasons. First, a budget is a spending plan which reflects actual out of pocket expenses to be incurred. An economic analysis considers not only out of pocket costs but also opportunity costs (for example, resources already on hand which have an alternative use). Second, budgets take into consideration inflation whereas economic analysis generally consider costs in terms of constant dollars. Third, fringe benefits must always be included in an economic analysis. And finally, future costs and benefits in an economic analysis are stated in terms of their present values. Discounting is appropriate in an economic analysis because today's resources (or monies) are worth more than monies in the future. Discounting permits cost and benefit streams with different time phasing to be compared on an equal basis.

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Chapter 2

METHODOLOGY

2.1. DEFINING THE OBJECTIVES. The most important step in the economic analysis process is defining the objective. Most simply stated, an objective is some fixed standard of accomplishment. An objective should be stated in terms of a mission or goal. The actual wording of the objective is critical in that it should reflect a totally unbiased point of view concerning the method of solving the problem.

2.2. ASSUMPTIONS AND CONSTRAINTS. Assumptions are explicit statements used to describe the present and future environment upon which the economic analysis is based. Every analysis, no matter how formal or informal, will be filled with assumptions. The purpose of the assumptions is not to limit the analysis but to reduce complex situations to problems of manageable proportions. All assumptions must be carefully chosen and identified as such so that the decision-maker realizes the basis under which the alternatives were subsequently developed and evaluated.

a. Guidelines. Four rules to observe in making assumptions are:

(1) Don't confuse assumptions with facts. Make assumptions only when they are absolutely necessary to bridge gaps in essential information that cannot be obtained -- even after diligent research.

(2) Be certain the assumptions are realistic and not mere platitudes or wishful thinking.

(3) State assumptions positively, using the word "will". For example, "The ADP system will have an economic life of eight years". "MILCON funds will be available in FY 8X".

(4) Ask yourself if your conclusions would be valid if one of the assumptions did not hold. If the answer is yes, then eliminate the assumption because it is not a requirement that must be met.

b. Examples. Examples of assumptions include the estimated future workload, the estimated useful life of an asset, and the period of time over which alternatives will be compared.

2.2.2. Constraints. Constraints are factors external to the relevant environment which limit alternatives to problem solutions. They may be physical, as with a fixed amount of space; time-related, as with a fixed deadline; financial, as with a fixed or limited amount of resources; or institutional, as with organizational or defense policy/regulations. Whatever their particular characteristics, these external constraints or barriers

are beyond the control of the manager and provide boundary limitations for alternative solutions to a particular problem.

2.2.3. Caution. Caution must be exercised in determining assumptions and constraints. An alternative is feasible only when it satisfies all the restrictions assumed by the analyst. Use of unduly restrictive assumptions and constraints will bias an analysis, precluding investigation of feasible alternatives. Conversely, failure to consider pertinent assumptions and constraints can cause the recommendation of a technically or institutionally infeasible alternative.

2.3. ALTERNATIVES. The next step in the process is to identify all feasible means of meeting the objective. A comprehensive discussion of the techniques and operational characteristics of each alternative must be presented. As a minimum, this discussion should include a description of the method of operation, the volume of workload, the type of equipment used and any other factors unique to the system.

2.3.1. Developing Alternatives. In developing alternatives, the analyst must insure that each consider the same mission. All alternatives must satisfy the minimum requirements of acceptability. Later evaluation will reflect the differences in acceptability or effectiveness. Rarely is it true that there is just one way to attain a given objective (e.g., buy vs. lease, manual vs. automated, repair vs. replace). Thus, the discussion of alternatives must demonstrate that the reasonable options have been explored.

2.3.2. Current System. The search for alternative solutions to an existing problem should not overlook the current system. The current system represents the alternative which seeks to identify the level of costs and benefits which would accrue without changing the present method of operation. If a current system exists and is considered feasible, it will serve as a baseline with which to compare new alternatives. Note that if there is no feasible current system, there is no baseline.

2.4. ESTIMATING COSTS AND BENEFITS. In actual practice, the step that is usually the most difficult and time-consuming is that of estimating the costs and benefits of each alternative. Most simply stated, costs are inputs, whereas benefits are outputs. Costs and benefits should be determined for the entire useful life of the project. Appropriate estimates must be made by the year in which the cost is to be incurred or the benefit is to be received.

2.4.1. Costs. In comparing costs, the decision maker is concerned with those costs which differ between alternatives. Costs which would not change under any alternative may be omitted from the analysis, although it is generally a good idea to note this exclusion under the list of assumptions.

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2.4.2. Benefits. Benefits are usually not so easily identifiable as costs but still should be quantified to the maximum extent possible. Those nontangible benefits which are more difficult to evaluate and quantify, such as "increased morale" or "increased safety" should be identified and included in the analysis with a narrative description. It is important that the analyst research possible avenues to assure that he has obtained the best available cost and benefit estimates.

2.4.3. Documentation. Because the acceptance of the analysis is dependent upon the credibility of the estimates, it is essential that all sources and derivations of cost and benefit data be documented.

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Chapter 3

ANALYSIS CONTENT

3.1. INTRODUCTION.

3.1.1. General. An economic analysis must identify and evaluate all anticipated expenditures associated with each proposed alternative over its entire life cycle. The cost of developing, procuring, and operating the system must be accounted for. Any cost that will be incurred no matter what choice is made need not be included in the analysis. For purposes of the economic analysis, costs are separated into two categories: non-recurring and recurring. Non-recurring costs occur on a one-time basis; they are typically associated with the start-up or implementation of an alternative (though exceptional costs may also be incurred during the operating life-cycle). Recurring costs occur on a repetitive, year-to-year basis; they are needed to sustain an alternative throughout its life-cycle, once it has been implemented.

3.1.2. Definitions.

a. Research and Development. Costs primarily associated with the development of a new system or capability to the point where it is ready for introduction into operational use. A system's research and development costs are one-time costs and are a function of the nature of the system.

b. Investment. Costs beyond the development phase to introduce new systems or a new capability into use. Investment costs are a function of the number of units planned for the system.

c. Operations. Recurring costs of operating, supporting, and maintaining the system or capability. Operating costs depend on both the number of units in the program and the length of time that such units are operated, supported, and maintained.

d. Sunk Costs. Sunk costs are those costs which have already been incurred or which have irrevocably been committed to a project. They are considered irrelevant in an economic analysis. Although sunk costs should not be included as part of the cost analysis, a narrative account of such costs is generally made to provide additional background information.

3.2. NONRECURRING COSTS. Nonrecurring costs are those costs made on a one-time basis. Normally these include expenditures for investments and include all costs associated with the acquisition of equipment, real property and nonrecurring services. Nonrecurring costs may be either additive or nonadditive. Additive costs are unprogrammed or unbudgeted costs of acquiring new resources. Nonadditive costs are the expenses diverted from existing resources.

3.2.1. Cost Categories.

a. Research and Development (R&D) Costs. Costs incurred prior to the initial staffing and equipping of a system/program. R&D costs include those necessary to design the system and its components and to perform development testing. The costs essentially end once an alternative is ready to be introduced into use.

b. Investment Costs. Costs associated with the acquisition of equipment and real property; nonrecurring services; nonrecurring operation and maintenance (startup) costs; and other one-time investment costs. Investment costs may be spread over several years, and the anticipated years of incurrence should be identified.

c. Working Capital. The amount of liquid funds and current assets on hand or on order. Generally, working capital is some form of inventory of consumables or similar resources held in readiness for use or in stock. Working capital changes can be positive (representing additional funding requirements) or negative (representing a reduction in funding requirements).

d. Value of Existing Assets Employed. The value of assets already on hand which are to be used with the new project. This value is included in the investment cost only when the existing asset is currently in use (or has an alternative planned use) on some other project, or was intended for sale. Such existing assets should be included at their fair market value and the basis for arriving at the estimate should be documented.

e. Terminal/Residual Value. In many instances value can be imputed to assets no longer being used. This value can be either terminal or residual. Terminal value is the expected value of building, equipment or other assets at the end of their economic lives and is treated as a reduction in the life-cycle cost of the particular alternative or which the use of the asset is intended. Residual value is the computed value of assets at any point in time. Residual value may or may not coincide with terminal value. Terminal/residual value should be applied to existing assets replaced as well as new assets being acquired.

f. Scrap Value of an Asset. If an asset is to be scrapped, then the only value is the scrap value less costs of dismantling and selling. Scrap values are often so small and occur so far in the future that they may have no significant impact on the decision. In such cases, terminal value need not be included in the analysis. If, however, the scrap value is expected to be significant, this value should be included in the analysis. Accompanying this value should be explicit assumptions used in deriving the estimate.

g. Sale of an Asset. If property is sold, the proceeds benefit the government because they are included in Miscellaneous

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Receipts by the Treasury Department. The value will be the actual sale price of the item less costs of the sale.

h. Reutilization of an Asset. If property is redistributed to some other Federal Agency, that agency is benefitted even though there is no reimbursement of cash flow to the agency which controlled the property initially. In this case the asset's value is determined by its worth in the market less costs attributed to redistribution.

i. Continued use of an Asset. Often the need for a service will extend far into the future. When this occurs, the automatic replacement of assets and repeating cash flows will result in a repetitive cycle of expenditures.

3.3. RECURRING COSTS. Recurring costs, identified as operation costs, are those costs that are incurred on a periodic basis throughout the project period. Such costs are generally acquired each year and also may be additive or nonadditive; they include both civilian and military personnel services, materials, operating supplies, utilities and equipment maintenance.

3.3.1. Personnel Costs. This category includes personnel costs (civilian and military), employee benefits, and other personnel related costs.

a. Civilian Personnel Costs. Civilian personnel costs are based on current annual salaries as defined by the General Schedule and Wage Board pay rates. Where specific skills can be identified with an operation/process, the actual grade and step should be used in computing resources. Where a mixture of skills is identified with an operation/process, the resource estimates may be computed using the fifth step of the designated grade level. Methods for adjusting civilian personnel costs can be found in Appendix C.

b. Military Personnel Costs. Military personnel costs are based on the current composite military rates. These rates are identified in the NAVCOMPT Manual, para 035750. The composite rates provide for the basic pay, incentive and special pay and certain expenses and allowances included in the active forces military personnel appropriations. Methods for adjusting military personnel costs can be found in Appendix D.

c. Other Personnel Related Costs. Other personnel related costs which pertain to the performance of the function under consideration and should be included in the analysis, if appropriate, are such items as travel, per diem, periodic training, etc.

3.3.2. Operating Costs. This category covers operating costs other than labor. Included are:

- a. Equipment rental/maintenance
- b. Space rental/maintenance
- c. Materials and supplies
- d. Utilities
- e. Communications
- f. Commercial services

3.3.3. Overhead Costs. Some costs are classified as overhead because it is impossible to associate them directly with products worked on. Included in this category are: accounting, legal, fire and police protection, custodial services and general administrative expenses. When estimating overhead costs associated with an alternative, care must be taken to itemize only the overhead costs which will change as a result of the investment proposed. For example, an alternative which results in a significant decrease in personnel needed to provide a specific service may have little or no effect on the size of the security force.

3.4. PRESENTATION OF COST DATA. The analysis should contain a description of each cost element and how it was derived. For example, if personnel requirements were computed based on specific production rates, those production rates should be identified as well as the numbers and grades of people needed. Once all costs have been discussed they should be presented in a manner which will allow the decision maker to easily review the data. The cost should be considered on a cash flow basis for each year and should be identified by category; nonrecurring or recurring. A sample format for presenting cost is shown in Figure 3-01.

**UNDISCOUNTED COSTS**  
ALTERNATIVE No.

COST ELEMENT	FY0	FY1	FY2	.....	FYn	TOTAL COST
1. Nonrecurring Costs a. ADPE b. Site Construction c. System Development d. Telecommunications e. Travel						
2. Recurring Costs a. ADPE Maintenance b. Personnel c. Space Rental d. Supplies e. Telecommunications						
<b>TOTAL COST</b>						

FIGURE 3-01  
Sample Cost Presentation Format

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3.5. INFLATION. For an economic analysis to be a useful decision-making tool, estimates of future costs and benefits must be as realistic as possible. The forecasting of such costs becomes more complicated when there is a persistent and appreciable rise in the general level of prices over time. This condition is commonly referred to as inflation. The problem caused by inflation is not simply that future acquisitions are likely to cost more than today's estimates; but that there exists an uncertainty as to how much more they will cost. It is this uncertainty which so complicates financial planning and the economic analysis as well. Therefore, some method of determining the rate of inflation must be established.

3.5.1. Analysis of Inflation. Department of Defense policy regarding the treatment of inflation in economic analysis, as promulgated by DODI 7041.3, and SECNAVINST 7000.14B requires a two-phased approach:

a. Constant Dollars. The analysis should be performed first in terms of constant dollars; i.e., all estimates of costs and savings during the project life should be made in terms of base year prices.

(1) Cost projections may be changed over the period of analysis to reflect only real changes in costs due to changes in amounts of services (for example, an increased in the amount of repair) and improvements at prices in effect at the beginning of the period of analysis.

(2) Cost projections may also be changed due to economies or diseconomies of scale resulting from an increase or decrease in the quantity of goods and services purchased.

b. Current Dollars. If inflation is deemed important to the conclusion of the study, a second computation should be made in terms of current dollars. Costs and monetary benefits stated in current dollars reflect the actual amount which will be paid including any amount due to future price changes.

(1) To avoid overestimating and double counting for the effects of inflation, consideration must be given to such factors as contract provisions which may already include provision for inflation, labor agreements, productivity and quantity changes, and the extent to which material is already on hand or will be furnished under fixed price contracts.

(2) Whenever practicable, estimates will include forecasts of changes in price levels on the basis of specific data applicable to a given acquisition. The source of the inflation factors and the rates used are to be included as part of the analysis.

(3) The estimates of inflation will be identifiable by fiscal year. Particular care should be taken when including inflation in cost estimates for more than four years beyond the budget year because of the uncertainty in making forecasts of future national economic conditions and the fact that imputed values for inflation are subject to considerable change.

3.5.2. Inflation in Comparative Studies. The requirement to perform a baseline analysis in constant dollars promotes consistency among comparative economic studies. Moreover, introduction of inflation factors into the analysis will have little or no effect in the final ranking of the alternatives. However, for those instances when an inflated dollar comparison is nonetheless considered appropriate, only a differential inflation rate (i.e., the expected difference between the average long-term rate for the particular cost or cost element) should be applied in the escalation of the base-year annual cost estimate. It must be remembered that a normal escalation component is automatically introduced when discount factors are applied.

3.6. DISCOUNT RATES. The Government recognizes the effect time has on money and has adopted the practice of discounting when evaluating investment projects. In DOD, discounting must be applied whenever the costs or cash benefits of a project would extend over a period of time greater than three years from the project inception date. The current prescribed discount rate is 10%; however, OMB Circular A-94 should be used to obtain the latest prescribed discount rate. In order to ease the computational task of discounting a number of standard present value tables were developed and are available for general use.

### 3.7. BENEFIT QUANTIFICATION.

#### 3.7.1. General.

a. Benefits. Benefits are the outputs expected for costs incurred. The term "benefits" in this usage is synonymous with results, utility, effectiveness, or performance. Because costs relate to inputs, not outputs, reductions in costs are not considered benefits. The purpose of benefit analysis is to present to the decision-maker an orderly, comprehensive, and meaningful display of all returns expected for each alternative within the scope of the economic analysis under consideration. As might be expected, benefits are more difficult to quantify than costs. The reason is that benefits tend to have more intangibles. In most instances there is no simple common denominator such as dollars in the case of costs. If a common denominator is not available, returns should be ranked according to some hierarchy of values so that a more rational choice of alternatives can be made.

b. Methodology. The analyst must approach the problem of benefit analysis in a manner applicable to the situation but should basically use a three step methodology.

- (1) Determine, list, and define the relevant benefits.
- (2) Identify the sources of information.
- (3) Devise a system for measuring the benefits.

c. Negative Aspects. In addition to benefits, the analyst should also include information concerning any negative aspects of alternatives, quantified wherever possible. This information is important to the decision-maker and may be a determining factor in deciding between possible investment alternatives.

### 3.7.2. Determine, List, and Define Relevant Benefits.

a. Determine Benefits. This step involves determining the benefits for each alternative - whether the benefit is thought to be potentially quantifiable or not quantifiable. The analyst should list all benefits which may possibly shed light on the economic analysis alternatives. It is quite possible that some of the benefits listed in this first iteration will eventually be discarded and others will become evident further on in the analysis. A full description of each benefit should be given in relation to its respective alternative in the economic analysis.

b. Categories. The benefits expected of any alternative may fall into various "categories" depending upon the kind of program, system, operation, organization, etc., being analyzed. Terminology used for these categories is generally descriptive of the benefits included. The following list of categories is a guide to be used by the analyst in his effort to include all benefits related to an alternative. The list is not intended to be all inclusive; it is only illustrative of some of the types of benefit categories that could be applicable depending on the problem. Some of the categories under which benefits appear are:

(1) Production. Number of commodities or items produced for each alternative (e.g., number of meals served, components manufactured). This could be related to comparable time periods of the economic analysis.

(2) Productivity. (Related to staffing benefits) Number of items per productive man-hour, volume of output related to man-hours.

(3) Operating Efficiency. At what rate does the system consume resources to achieve its output (e.g., miles per gallon, copies per kilowatt hour)?

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(4) Reliability. This describes the system in terms of its probable failure rate. Useful measures may be mean-time-between-failure, the number of service calls per year, percent refusals per warehouse request.

(5) Accuracy. What is the error rate? It may be possible to measure errors per operating time period, the number of errors per card punched, errors per hundred records, errors per 100 items produced.

(6) Maintainability/Controllability. Has adequate human engineering been performed? Is the system compatible with adequately trained "crew" members? When the system does fail, is it difficult to repair because of poor accessibility? A useful measure could be based on the average number of manhours necessary for repairs over a given time period, "downtime," or the crew size necessary to control and maintain the system.

(7) Manageability. Consider how the workload of the organization will be affected by increased or decreased supervision or inspection time as a result of the system. Man-days could be used as a measure. Difference in kind of personnel might be a factor as well as availability of type needed.

(8) Integratability. Consider how the workload and product of the organization will be affected by the changes necessitated in modification of existing facilities or equipment, technical data requirements, initial personnel training, warehouse space for raw goods or parts storage.

(9) Availability. When can each system be delivered/implemented; when is it needed to meet proposed output schedules? What is the lead time for spare parts delivery?

(10) Service Life. Consider how long the proposed system will affect the organization's workload or output. What about obsolescence?

(11) Quality. Will a better quality product/service be obtained? Could quality be graded, thus measurable? If not, a description of improvement could be given. What is the impact of varied quality?

(12) Acceptability. Consider the alternative in terms of whether it may interfere with the operation for parallel organizations or the operation or prerogatives of higher echelon organizations.

(13) Ecology. Consider the ecological aspects of each alternative. What are the current legislative requirements?

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(14) Economic. Consider employment benefits, DOD small business obligations, economically depressed area relationships, and legislative requirements.

(15) Morale. Consider employee morale. This could be measured by an opinion sample survey.

(16) Safety. Consider number of accidents, hazards involved.

(17) Security. Is security built in? Will more precautions be needed? More guards? Are thefts more likely?

c. Pertinent Benefit Categories. These will become evident as the analysis of the alternatives is performed. The benefits, of course, should be defined and described for each alternative under review.

3.7.3. Identify Sources of Information for Benefit Determination. For each benefit listed, the analyst should identify: (1) the source of information, (2) in what form it is available, and (3) how he proposes to gather the needed information and the feasibility of doing so. Sources of information should apply to benefits which may be quantifiable as well as those which do not seem quantifiable. In estimating parameters it is best to obtain the maximum amount of information. Should the analyst decide that obtaining the needed information is impractical, he should be able to support his position.

3.7.4. Devise a System for Measuring Benefits. The third step is to devise a measurement system for the output of each alternative. Such measurement can vary from precise quantities of physical output for the more tangible benefits to general narrative descriptions for the intangibles as discussed below.

a. Quantifiable Output Measures.

(1) Economic analysis is most effectively applied where output can be defined in terms of physical yield. Each analysis will possess its own measure of effectiveness. In fact, there may be any number of different measures. For example, reduced pollution can probably be stated in some quantifiable terms, such as gallons per hour. Decreased procurement leadtime could be given in days or in changes in inventory levels. In citing increased safety as a benefit, one could state the number of employees exposed to the dangers for each of the proposed alternatives.

(2) If precise quantification of benefits is impossible, perhaps a relationship can be established among the alternatives. The benefits of one may be expressed in the form of an index and all others related to it. Or perhaps a selected alternative can be used in developing ratios with the other alternatives.

(3) As quantification of benefits becomes less feasible, ranking must be accomplished on a more subjective basis. This may consist of simple numerical listing in order of preference with the alternative's position in the list not indicating any particular level of benefits. A verbal scale may also be used in which alternatives are described by using adjectives to indicate their relationships (e.g., "excellent, good, poor"). These measurements are useful but are less precise than those mentioned above.

b. Nonquantifiable Output Measures.

(1) Despite the analyst's best efforts to develop quantitative measures of benefits, he sometimes is faced with a situation which simply does not lend itself to such analysis. Certain projects may provide nontangible benefits such as improved morale, better community relations, and other similar qualitative advantages. Although they are more difficult to assess, these benefits should be documented and portrayed in the economic analysis.

(2) In most such instances the analyst must resort to written qualitative benefit descriptions. This is the least preferable method of analyzing benefits due to its inherent lack of precision. However, under certain conditions this method must suffice. If the following guidelines are observed, qualitative statements can make a positive contribution:

(a) Identify all benefits attendant to each alternative under consideration. Give complete details.

(b) Identify benefits common in kind but not in extent or degree among alternatives. Explain differences in detail.

(c) Avoid platitudes. All prospective projects are normally worthwhile in that they support national defense, and statements to this effect are unnecessary. Platitudinous statements serve only to cloud the decision-making environment.

3.8. COMPARING ALTERNATIVES. Once costs and benefits for all alternatives have been determined, an evaluation of one proposal against another can be made.

3.8.1. Comparison Criteria.

a. General Criteria. Comparison and ranking can usually be accomplished by one of three general criteria: least cost for a given level of effectiveness, most effectiveness for a given constraint, or the largest ratio of effectiveness to cost. These criteria conform to the three basic types of cost/benefit relationships: unequal cost/equal effectiveness, equal cost/unequal effectiveness, and unequal cost/unequal effectiveness.

b. Equal Costs and Benefits. There could be situations resulting in alternatives having both benefits and costs of equal nature. Preference in these cases would, of course, be determined by noneconomic factors.

3.8.2. Comparison Techniques. Techniques which can be used to evaluate and compare alternatives include:

a. Present Value Analysis. A means of bringing all future costs and benefits back to their present worths. This technique is employed in economic analysis where the economic life is greater than three years.

b. Uniform Annual Cost. A cost-oriented approach for evaluating alternatives with unequal economic lives.

c. Savings/Investment Ratio. The relationship between future cost savings (or avoidances) and the investment cost necessary to effect those savings. Because savings is a necessary ingredient, this technique can be employed only when there is a status quo alternative.

d. Discounted Payback. Technique for determining the period over which accumulated present value savings are sufficient to offset the total present value costs of a proposed alternative. Again, a status quo must be involved in order to apply this technique.

e. Break-even Analysis. A procedure which focuses on finding the value of the variable (the break-even point) at which a manager is indifferent regarding two possible courses of action.

f. Cost/Benefit Ratio. A means of showing the relationship between output and cost. This technique is used to assess alternatives having unequal costs and unequal benefits.

### 3.9. SENSITIVITY ANALYSIS.

3.9.1. Elements of Uncertainty. Elements of uncertainty involved in an economic analysis must be carefully examined to determine their effects and influence on the ultimate analysis recommendations. The analyst does this by evaluating those factors having key relationships with the results of the analysis and by exploring the extent and magnitude of the impact. This evaluation is often referred to as sensitivity analysis.

3.9.2. Sensitivity Analysis. In performing a sensitivity evaluation, an investigation is conducted to determine how the economic analysis results may change with respect to changes in the system parameters or basic assumptions. If a change in a parameter or an assumption results in a proportionately greater change in results, then the study results are said to be sensitive to that parameter or assumption. By including the results of the sensitivity analysis in the final economic analysis presentation,

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the analyst assures the decision-maker that the uncertainties have been considered.

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Chapter 4

CONTENT AND FORMAT

4.1. DOCUMENTATION STANDARDS. The economic analysis will consist of four separate steps: (1) Alternatives; (2) Cost/Benefit Analysis, (3) Funding Support Analysis, and (4) Development Alternatives Analysis. Each of the four steps will result in a separate deliverable document.

4.1.1. Alternatives Report. Describe the overall concept for each alternative. Alternatives which were originally considered but later shown to be technically or operationally infeasible need not be quantified or analyzed in depth but should be discussed. The current system must be included.

a. Table of Contents. Appendix E shows the required table of contents for the Alternatives Report. These documentation requirements follow the steps necessary to document all alternatives considered. Additional detail can be provided at the discretion of the system developer preparing the report, but must be presented within these section headings.

b. Description of Contents. Appendix F defines the contents of each section of an Alternative Report.

4.1.2. Cost/Benefit Analysis Report. A Cost/Benefit Analysis will include the full cost and benefits of each alternative as well as the comparison of each alternative to the baseline case and/or to other cases.

a. Table of Contents. Appendix G shows the required table of contents for a Cost/Benefit Analysis Report. These documentation requirements follow the sequence of steps necessary to perform a Cost/Benefit Analysis. Additional detail can be provided at the discretion of the system developer preparing the report but must be presented within these section headings.

b. Description of Contents. Appendix H defines the contents of each section of a Cost/Benefit Analysis Report.

4.1.3. Funding Support Analysis Report. A Funding Support Analysis establishes fiscal cost requirements for one or more alternative. This report will identify the funding schedules to reflect these costs.

a. Table of Contents. Appendix I shows the required table of contents for a Funding Support Analysis Report.

b. Description of Contents. Appendix J defines the contents of each section of a Funding Support Analysis Report. In addition, summary data may be reported within the document.

4.1.4. Development Alternatives Analysis.

A Development Alternatives Analysis provides an assessment of the impact of specific alternatives for attaining a particular portion of the system. The level of detail is more precise than would be defined in a functional specification. For example, a functional specification, if available, would identify the need for particular types of data entry while the Development Alternatives Analysis will evaluate and propose the number and type of terminals to address that data entry requirement.

a. Table of Contents. Appendix K shows the required table of contents for an Development Alternatives Analysis Report.

b. Description of Contents. Appendix L defines the contents of each section of a Development Alternatives Analysis Report.

4.1.5. Evaluation Criteria.

a. Deliverables. The criteria that will be applied to each of the economic analysis deliverables to judge their completeness are that:

(1) All sections and paragraphs listed in the required table of contents match those of the actual delivered document.

(2) The content of each paragraph is consistent with the requirements stated in this standard.

(3) Data values are reported in a summary format similar to any sample forms presented herein.

(4) Summary data values are consistent with the detailed data (arithmetic) reported in the document.

(5) The conclusions reported are consistent with the data reported in the document.

b. Recommendations. The economic analysis deliverables may be complete, and yet the recommendation may be rejected in whole or in part. The criteria that will be applied to each of the economic analysis recommendations to judge their acceptability are that:

(1) The source data used to develop the analysis is valid and/or represents the best available information

(2) The appropriate weights have been applied in considering the effect of non-quantifiable costs and/or benefits.

4.2. DOCUMENTATION DEPENDENCIES. The documentation governed by this standard may also rely on the content of other project deliverables and/or standards. Figure 4-01, "Precedence Relationship," shows those project deliverables and standards



which impact the Economic Analysis deliverables.

4.2.1. Preceding Documents. The boxes that precede the Economic Analysis as shown by a connected line with an arrow, are those project deliverables that must be completed before the Economic Analysis. A dotted line indicates that there may not be any information available initially but that a future update is possible. The preceding documents for any one development effort are:

- a. General Design Specification Deliverables
- b. ADPE Support Plan Deliverables
- c. Telecommunications Support Plan Deliverables

4.2.2. Consultation Documents. The boxes and bars that are in line vertically with the Economic Analysis show the concurrent documents that may be consulted at that time. The boxes are other project deliverables governed by standards and the bars are particular conventions described by standards. The deliverables and standards used for consultation are:

- a. Configuration Management Plan Deliverables
- b. Quality Assurance Plan Deliverables
- c. Project Deliverable Style Manual (IRM-5230-02)
- d. Inspection and Acceptance (IRM-5231-17)
- e. Data Dictionary (IRM-5235-01)
- f. Library Management System (IRM-5233-06)

4.2.3. Change Requirements. Since the SDM is an integrated methodology, there exists a relationship between preceding documents which provide information to the follow-on documents. During the development of the Economic Analysis new issues may arise that will require changes to preceding documents. These changes must be documented and approved in accordance with the quality assurance and configuration management procedures. Externally imposed milestones that are unrealistic to accomplish should not be used as an excuse to defer or eliminate the documentation requirements.

Appendix A

GLOSSARY

ADP: ADP is an acronym for "ADPE Support Plan"  
CM: CM is an acronym for "Configuration Management Plan"  
DD: DD is an acronym for "Data Dictionary"  
EA: EA is an acronym for "Economic Analysis"  
FRD: FRD is an acronym for "Functional Requirements Definition"  
GDS: GDS is an acronym for "General Design Specification"  
IA: IA is an acronym for "Inspection and Acceptance"  
LMS: LMS is an acronym for "Library Management System"  
MENS: MENS is an acronym for "Mission Element Need Statement"  
QA: QA is an acronym for "Quality Assurance Plan"  
RS: RS is an acronym for "Requirements Statement"  
SDP: SDP is an acronym for "System Decision Paper"  
SM: SM is an acronym for "Style Manual"  
TP: TP is an acronym for "Test Plan"

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Appendix B

REFERENCES

The information needed to perform economic analysis can be obtained from a variety of sources. The following sources describe the mathematical formulas and the application philosophy of economic analysis as well as DOD and USMC requirements.

1. MCO P5231.1 Life Cycle Management For Information Systems
2. NAVDAC PUB 15 Economic Analysis Procedures for ADP
3. Thuesen, H.G., Fabrycky, W.J., and Thuesen, G. J., Engineering Economy , 4th Edition, (Englewood Cliffs, N.J., Prentice-Hall, 1971.)
4. NAVCOMPT Manual
5. DOD Instruction 7041.3
6. SECNAVINST 7000.14
7. OMB Circular A-94

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## Appendix C

CIVILIAN PERSONNEL COST ADJUSTMENTS

1. Adjustment for Fringe Benefits. It is important to note that civil service employees cost the government more than the normal amount of their salaries. This is because they draw fringe benefits. These benefits include the Government's contribution for civilian retirement, disability, health and life insurance and where applicable, social security programs. The value is customarily expressed as a percentage of annual base pay. Guidance for developing fringe benefits is set forth in OMB Circular A-76. The current prescribed rate is 26.00% and is comprised of the following factors:

- |  |       |
|--|-------|
| (a) Retirement and disability (for employees under Civil Service Retirement).                    | 20.4% |
| (b) Health and Life Insurance  | 3.7%  |
| (c) Other benefits, (including work disability, unemployment programs, bonuses and awards, etc). | 1.9%  |

Using the 26.0% fringe benefit factor, the total personnel cost for an individual who earns an annual base salary of \$14,000 is computed as follows:

$$\$14,000 + 26.0\% (\$14,000) = \$17,640$$

For civilian employees (normally temporary employees) who are not under the Civil Service Retirement System, the Social Security (FICA) cost factor to be applied to salary or wage cost is the actual employer contribution rate for the employees involved. When estimating FICA cost, care must be exercised to assure that the FICA rate is applied only to wages and salaries subject to the tax. Information regarding FICA tax rates and maximum salaries and wages to which they are applicable should be obtained from the appropriate personnel office.

2. Adjustment for Leave. When the civilian personnel services are specified in terms of the number of people required, the base pay automatically includes compensation for sick, holiday, and annual leave. However, when the personnel services are specified in terms of number of man-hours of work required, the base pay must be accelerated by a leave factor. This is necessary since due to such absence, more than one person is required to perform one man-year (2080) man-hours) of work. The OMB prescribed leave rate is 18%.

Once the work requirement has been adjusted to account for leave, the 26.0% fringe benefit factor is then applied. For example, if 400 man-hours are required to perform a certain function and the average wage is \$8 per hour, the total personnel costs would

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be computed as follows: First the 18% leave allowance would be included. The adjusted man-hours would be  $400 + (18\% \times 400) = 472$ . This amount is then multiplied by \$8 to give the adjusted base cost:  $472 \times \$8 = \$3776$ . Next, the 26.0% fringe benefit factor would be applied to the adjusted figure. Thus total personnel costs would be  $\$3776 + (\$3776 \times 26.0\%) = \$4758$ .

Appendix D

MILITARY PERSONNEL COST ADJUSTMENTS

1. Adjustment for Fringe Benefits. Adjustments must be made to the composite rate to include retirement and other personnel costs which are not included in the composite rate (e.g., medical and commissary costs). Acceleration factors for retirement and other personnel costs are provided in para 036760 of the NAVCOMPT Manual. The current prescribed rate is 25% for officers and 40% for enlisted personnel and is comprised of the following factors:

- |  |     |
|--|-----|
| (a) Retirement Entitlement Accrual Rate    |     |
| for both officers and enlisted personnel   | 17% |
| (b) Accrual Rate for Other Personnel Costs |     |
| for officers                               | 8%  |
| for enlisted personnel                     | 23% |

2. Adjustment for Leave. Adjustments for leave for military personnel is applied in the same manner as civilian leave. The acceleration factor prescribed by the NAVCOMPT Manual is 20%.

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Appendix E

ALTERNATIVES REPORT TABLE OF CONTENTS

Alternatives Report

- Section 1. Introduction
- Section 2. Objective
- Section 3. Current System
- Section 4. Proposed System(s)
- Section 5. Evaluation
- Section 6. Conclusions
- Section 7. Recommendation

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Appendix F

ALTERNATIVES REPORT CONTENT DESCRIPTION

SECTION 1 INTRODUCTION

This section will provide a general overview of the portion of the work that is under evaluation. It will establish the scope of the report.

SECTION 2 OBJECTIVE

This section will state the major purpose of the report.

SECTION 3 CURRENT SYSTEM

The current system represents the alternative which seeks to identify the level of costs and benefits which would accrue without changing the present method of operation. If a current system exists, it will serve as a baseline with which to compare new alternatives.

SECTION 4 PROPOSED SYSTEM(S)

Describe the overall concept for each of the feasible alternatives.

a. Determination of the technical and operational feasibility of each alternative approach, including a discussion of the underlying rationale.

b. Presentation of life cycle cost estimates for the technically and operationally feasible alternative approaches.

c. Discussion of the benefits of the technically and operationally feasible alternative approaches.

d. Discussion of the basis for selecting the recommended approach(es).

Alternatives which were judged not feasible need not be costed in the EA but should be discussed.

SECTION 5 EVALUATION

The alternatives documented in previous sections that are feasible for further design and development should be outlined. The steps used by the analyst in determining which alternatives should be considered for further development should be outlined.

SECTION 6 CONCLUSIONS

The conclusions reached by the previous analysis should be reported here. Brief statements of the findings should be used, and no new material should be introduced.

SECTION 7 RECOMMENDATION

A final recommendation should be stated as a result of the previous evaluation. This recommendation should identify those alternatives to be considered for further development.

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Appendix G

COST/BENEFIT ANALYSIS REPORT TABLE OF CONTENTS

Cost/Benefit

Section 1.	Introduction
Section 2.	Objective
Section 3.	Assumptions
Section 4.	Cost/Benefit Analysis
4.1	Economic Life
4.2	Basis for Comparison
4.3	Alternatives
4.4	Cost Categories
4.5	Cost Measurements
4.6	Benefit Categories
4.7	Benefit Measurements
Section 5.	Evaluation
Section 6.	Sensitivity Analysis
Section 7.	Conclusions
Section 8.	Recommendation

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Appendix H

COST/BENEFIT ANALYSIS REPORT CONTENT DESCRIPTION

SECTION 1 INTRODUCTION

This section will provide a general overview of the portion of the work that is under evaluation. It will establish the scope of the report.

SECTION 2 OBJECTIVE

This section will state the major purpose of the analysis in functional terms without implying how it is to be done.

SECTION 3 ASSUMPTIONS

This section will list all assumptions governing the analysis. Also include any constraints, limitations, or exclusions related to the analysis.

SECTION 4 COST/BENEFIT ANALYSIS

Cost/Benefit Analysis is the evaluation of the costs of all feasible alternatives, followed by the evaluation of benefits associated with these costs. This section should provide the cost data and will show the steps used in performing the analysis.

4.1 ECONOMIC LIFE

For each Cost/Benefit Analysis undertaken, an appropriate economic life must be described. Economic life is defined as that period of time over which the savings or benefits to be gained from the project may reasonably be expected to accrue.

The economic life will ultimately be governed by one of three factors:

1. The Mission Life is that period of time over which a need for the asset or program is anticipated. (For example, an incoming college freshman has decided to purchase a used car for commuting to and from school. Since his grandfather has promised him a new car only during his remaining time in school, the mission life of the car is four years.)

2. The Physical Life is the period during which a facility or piece of equipment will be available for use before it is exhausted in a physical sense; that is, decayed or deteriorated. The physical life of an asset may vary from project to project depending upon usage. (The college student has looked at a number of used cars. One of the cars he is considering is fairly new and has been well maintained. Its expected physical life is six years.)

3. The Technological Life is the period of time before which improved technology would make an asset obsolete. (Since the car described above is fairly new, gets good gas mileage and meets all current federal pollution and safety requirements, its technological life is estimated to be ten years.)

The economic life will generally be the shortest of the mission, physical, or technological lives. In the above example the economic life is four years. Note, that due to planning horizon limitations it is recommended that economic lives in excess of 30 years not be used in analysis. Moreover, due to discounting, streams existing beyond 30 years have little effect.

#### 4.2 BASIS FOR COMPARISON

A consistent means of comparing the cost of several alternatives must be selected. The selection should be one of the accepted methods of assessing costs incurred at various times throughout the system life span. This section should identify and support the selection of one of the methods.

The simplest way to compare the alternatives is to perform a present value analysis. To perform this analysis, all costs and receipts for each alternative are put in terms of their worth as of the date the comparison is to be made. The alternative having the lowest present value cost is considered the least costly alternative. Figure H-01, "Present Value Analysis" provides an example.

#### 4.3 ALTERNATIVES

The process used to identify and describe each alternative should be described in this section. As development work proceeds, subsequent revisions to the EA will probably rely on the use of the Functional Requirements Definition to define the baseline case from which relative costs and benefits will be measured. The General Design Specifications will be used to derive the set of permissible alternatives. Initially, requirements statements will be used to define the system for costing.

This section will describe the overall concept for each alternative under study. It will go into further detail than Section 1, "Introduction," using figures to depict each alternative and tables to compare specific characteristics that individually distinguish each alternative. The current method of doing this function should also be identified and should be used as the baseline from which costs and benefits are measured or compared.

The general decision making process to be applied must also be defined. This may include any pre-screening elimination criteria applied to the alternatives, and the guidelines by which favored alternatives will be selected.

**PRESENT VALUE ANALYSIS**  
**ALTERNATIVE: A**  
**(\$000)**

PROJECT YEAR	NONRECURRING COSTS	RECURRING COSTS	TOTAL COSTS	DISCOUNT FACTOR	DISCOUNTED COSTS	CUMULATIVE DISCOUNTED COSTS
FY79		9,191.1	9,191.1	.954	8,768.3	8,768.3
FY80		9,475.1	9,475.1	.867	8,214.9	16,983.2
FY81		10,157.8	10,157.8	.788	7,980.7	24,963.9
FY82		10,574.7	10,574.7	.717	7,582.1	32,546.0
FY83		11,114.5	11,114.5	.652	7,246.7	39,792.7
FY84		11,819.4	11,819.4	.592	6,997.1	46,789.8
FY85		12,733.8	12,733.8	.538	6,850.8	53,640.6
FY86		13,922.0	13,922.0	.489	6,807.9	60,448.5
FY87		15,466.8	15,466.8	.445	6,882.7	67,331.2

**FIGURE H-01**  
**Present Value Analysis Example**

#### 4.4 COST CATEGORIES

This section should report the breakdown of cost categories. The breakdown of costs for the system should be hierarchical to a sufficient level of detail to allow reasonable estimates to be derived. These costs can then be aggregated into groups.

Cost categories should distinguish between in-house and contractor work. For in-house work, particular consideration should be given to the utilization of the existing work-force and investment in personnel, and the absence of available staff or skills. For contractor work, particular consideration should be given to any constraints on the funding of outside work. Costs should include both capital (non-recurring) and periodic (recurring) expenses.

For in-house and contractor work, the cost of the anticipated effort should be estimated to show, at a minimum, the following level of detail:

- a. Development labor
- b. Equipment
  - (1) Hardware and materials
  - (2) Installation labor
- c. Operations labor
- d. Maintenance
  - (1) Labor
  - (2) Annual supplies

#### 4.5 COST MEASUREMENTS

This section will report the measurement of costs. Cost is defined as the total of all costs incurred less any savings that will result. The process for evaluating the cost of a project should include the requirements over the entire life of the system. Costs are a component in the Cost/Benefit Analysis and may be used as a source of information for other steps in the project. Cost measures the added burden to the USMC for development, investment, and ongoing operation of the system. The means for gathering cost data and extracting cost estimates from that data will be documented in this section. Possible strategies include the following:

- a. Manufacturer quotes
- b. Historic trends
- c. Parametric analysis

#### 4.6 BENEFIT CATEGORIES

This section should report the breakdown of benefit categories. The determination of benefits to the user should be broken down hierarchically to a sufficient level of detail.

#### 4.7 BENEFIT MEASUREMENTS

This section should report the measurement of benefits. This information supplements the cost analysis information so that the impact of each of the alternatives under consideration can be compared. In addition, benefits are usually necessary to justify positive cost alternatives by showing a compensating burden reduction to the user in the regular application of the system.

### SECTION 5 EVALUATION

The costs and benefits documented in previous sections should be discussed in a narrative format, and summary values should be reported in a standard form. The steps used by the analysts in comparing the costs of each alternative, and benefits of each alternative should be documented in this section.

### SECTION 6 SENSITIVITY ANALYSIS

If a sensitivity analysis is indicated, the parameter selected for the analysis must be identified and the impacts of expected change documented. Figure H-02 provides a sample.

### SECTION 7 CONCLUSIONS

The conclusions reached by the previous comparative evaluation of the alternatives should be reported here. Brief statements of the findings should be used, and no new material should be introduced.

### SECTION 8 RECOMMENDATION

A final recommendation should be stated as a result of the previous conclusions. This recommendation should identify one alternative as the selected alternative and should state whether a funding profile and/or acquisition strategy analysis will be performed.

**SENSITIVITY ANALYSIS  
CONVERSION COSTS  
(\$000)**

FISCAL YEAR	DISCOUNT FACTOR	ALTERNATIVE A				ALTERNATIVE B			
		NO CHANGE		10% CHANGE		25% CHANGE		50% CHANGE	
		UNDISCOUNTED COST	CUMULATIVE DISCOUNTED COSTS						
FY79	.954	\$ 9,191.1	\$ 8,768.3	\$13,630.1	\$13,003.1	\$13,927.9	\$13,287.2	\$14,424.3	\$13,760.8
FY80	.867	9,475.1	16,983.2	16,444.5	27,260.5	16,990.4	28,017.9	17,900.4	29,280.4
FY81	.788	10,157.8	24,963.9	8,208.7	33,729.0	8,208.7	34,486.4	8,208.7	35,748.9
FY82	.717	10,574.7	32,546.0	9,101.4	40,254.7	9,101.4	41,012.1	9,101.4	42,274.6
FY83	.652	11,114.5	39,792.7	8,555.4	45,832.8	8,555.4	46,590.2	8,555.4	47,852.7
FY84	.592	11,819.4	46,789.8	8,742.1	51,008.1	8,742.1	51,765.5	8,742.1	53,028.0
FY85	.538	12,733.8	53,640.6	8,937.9	55,816.7	8,937.9	56,574.1	8,937.9	57,836.6
FY86	.489	13,922.0	60,448.5	9,143.6	60,287.9	9,143.6	61,045.3	9,143.6	62,307.8
FY87	.445	15,466.8	67,331.2	9,359.4	64,452.8	9,359.4	65,210.2	9,359.4	66,472.7

FIGURE H-02  
Sensitivity Analysis Example

ECONOMIC ANALYSIS  
IRM-5236-03

Appendix I

FUNDING SUPPORT ANALYSIS REPORT TABLE OF CONTENTS

Funding Support

Section 1.	Introduction
Section 2.	Objective
Section 3.	Assumptions
Section 4.	Funding Profile
4.1	System Life Cycle Period
4.2	Resource Availability
4.3	Measures of Merit
Section 5.	Evaluation
Section 6.	Conclusions
Section 7.	Recommendation

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Appendix J

FUNDING SUPPORT ANALYSIS REPORT CONTENT DESCRIPTION

SECTION 1 INTRODUCTION

This section should provide a general overview of the portion of the work that is under evaluation. This will reference the work breakdown structure, particularly that portion governing the work assigned to this developer as well as the developers statement of work. It establishes the scope of the report.

SECTION 2 OBJECTIVE

This section should state the major purpose of the analysis in functional terms without implying how it is to be done.

SECTION 3 ASSUMPTIONS

This section will state all assumptions that apply specifically to the preparation of the Funding Profile, will reference the appropriate Cost/Benefit Analysis Report as the source of cost data, and will identify the selected alternative.

SECTION 4 FUNDING PROFILE

A Funding Profile is used to evaluate the specific time schedule of payments anticipated to fund the project throughout the entire system life cycle. Using that time schedule of payments, a specific time line of funding should be developed and reported.

4.1 SYSTEM LIFE CYCLE PERIOD

For each cost feasibility analysis performed, an appropriate system life must be described and should include the following:

a. System Life Span - The system life span is the number of years in the system life cycle.

b. Time Line Of Costs (from Cost/Benefit Analysis) - A time line is a numeric or graphical representation of actual costs in each of several years throughout a specified period.

4.2 RESOURCE AVAILABILITY

This section should report the analysis of resources. Using the description of the total costs for any one alternative, the schedule of funding should be developed. Thus, the availability of resources at discrete points throughout the system life span can be assessed. Resources should include staff, software and hardware, and finances.

#### 4.3 MEASURES OF MERIT

This section should define the specific evaluation criteria. A standard set of decision guidelines should be set for use in evaluating minimum acceptability for any proposed alternative. These guidelines need to be specified as part of the Funding Support Analysis. These may include the following:

- a. Ability to pay
- b. Defense priorities
- c. Availability of resources

#### SECTION 5 EVALUATION

A brief discussion of the implications of the funding profile should be provided here. The summary values of the funding profile should be reported in a standard form.

#### SECTION 6 CONCLUSIONS

The conclusions reached by the previous evaluation should be reported here. Brief statements of the findings should be used, and no new material should be introduced.

#### SECTION 7 RECOMMENDATION

A final recommendation should be stated as a result of the previous conclusions. This will probably reaffirm the recommendation stated in the Cost/Benefit Analysis Report.

Appendix K

DEVELOPMENT ALTERNATIVES ANALYSIS TABLE OF CONTENTS

Acquisition Strategy

Section 1.	Introduction
Section 2.	Objective
Section 3.	Assumptions
Section 4.	Alternatives Analysis Strategy
4.1	Identification
4.2	Level of Risk
Section 5.	Evaluation
Section 6.	Conclusions
Section 7.	Recommendation

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Appendix L

DEVELOPMENT ALTERNATIVES ANALYSIS CONTENT DESCRIPTION

SECTION 1 INTRODUCTION

This section should provide a general overview of the portion of the work that is under evaluation. This will reference the work breakdown structure, particularly that portion governing the work assigned to this developer, as well as the developers statement of work. It establishes the scope of the report.

SECTION 2 OBJECTIVE

This section should state the major purpose of the analysis in functional terms without implying how it is to be done.

SECTION 3 ASSUMPTIONS

This section should state all assumptions that apply specifically to the Acquisition Strategy Analysis, should reference the appropriate Cost/Benefit Analysis Report as one source of initial cost data, and should identify the selected alternative.

SECTION 4 ALTERNATIVES ANALYSIS STRATEGIES

The approach to Development Alternative Analysis is to identify typical candidate areas in the system where there may exist distinctly different alternatives for obtaining the required hardware, software, or service. For each such area, specific alternatives are described in terms of probable cost reduction as well as an indication of any increase in risk that this may entail.

4.1 IDENTIFICATION

This section should identify the specific Alternative Analysis Strategies studied. These alternatives may include the following:

- a. Methods of operation and staff levels
- b. Quantity purchases such as terminals
- c. Existing tools such as off the shelf software

One or more Alternative Analysis Strategies may be proposed for specific parts of the selected alternative.

As the development work proceeds, subsequent revisions to the EA may use the General Design Specifications to identify specific areas in the system where there is a likelihood that alternatives exist that will achieve equal end results but with lower costs.

#### 4.2 LEVEL OF RISK

This section should report the risk involved in various Acquisition Strategies. This risk pertains only to the Acquisition Strategy and particularly to any uncertainty introduced by a particular Acquisition Strategy. Risk may be quantified in terms of probability of delay for subsequent system activities, provision for backup facilities, and the associated cost to then bring that alternative up to an acceptable level of risk.

For example, leasing terminals from a small company may be less costly but introduces a chance that maintenance or parts may not be available in the future. If possible, this probability value should be estimated and then applied to the cost of overcoming the problem, such as, the cost to stock spare parts or extra terminals.

#### SECTION 5 EVALUATION

A brief discussion of the analysis of various Acquisition Strategies should be provided here. The summary values used in comparing acquisition costs should be reported in a standard form.

#### SECTION 6 CONCLUSIONS

The conclusions reached by the previous evaluation should be reported here. Brief statements of the findings should be used, and no new material should be introduced.

#### SECTION 7 RECOMMENDATION

A final recommendation should be stated as a result of the previous conclusions. This should identify one specific acquisition strategy for each part of the selected alternative that was studied.

